

**PATENT APPLICATION**  
**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q80574

Mitsuaki HIROKAWA, et al.

Appln. No.: 10/806,416

Group Art Unit: 1797

Confirmation No.: 2263

Examiner: Krishnan S. MENON

Filed: March 23, 2004

For: SPIRAL SEPARATION MEMBRANE ELEMENT

**APPEAL BRIEF UNDER 37 C.F.R. § 41.37**

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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**I. REAL PARTY IN INTEREST**

The real party in interest is Nitto Denko Corporation, of Japan, by virtue of an assignment recorded on March 23, 2004 at reel 015126, frame 0448.

## **II. RELATED APPEALS AND INTERFERENCES**

There are no prior or pending appeals, judicial proceedings or interferences known to the Appellants which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**III. STATUS OF CLAIMS**

Claims 1-5 are pending, have been rejected, and are the subject of this appeal.

This is an appeal from the Examiner's rejection of claims 1-5 under 35 U.S.C. § 103(a).

#### **IV. STATUS OF AMENDMENTS**

On June 23, 2008, after the Final Office Action as mailed on January 29, 2008, Appellants filed an Amendment Under 37 C.F.R. § 1.116 that amended claim 1 in an attempt to reduce the issues for appeal. In the Advisory Action as mailed on July 2, 2008, the Examiner indicated that the June 23, 2008 Amendment would be entered for purposes of appeal. Accordingly, the claims stand as presented in the June 23, 2008 Amendment.

**V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

The present invention relates to a spiral separation membrane element for separating ingredients suspended or dissolved in liquids. More particularly, the present invention relates to a spiral separation membrane element effective in membrane separation conducted at low pressure, such as ultralow-pressure reverse osmosis filtration, ultrafiltration, or microfiltration. *See page 1, first paragraph.*

An object of the present invention is to provide a spiral separation membrane element effective in reducing the pressure loss around core tube perforated parts which is problematic especially in low pressure operations. *See page 3, second paragraph.*

The spiral separation membrane element of the present invention comprises a perforated cored tube formed with a plurality of perforations, a separation membrane, a feed-side passage material, a first permeation-side passage material, and a second permeation-side passage material. *See page 4 second paragraph.* The second permeation-side passage material is being spirally wound around the perforated cored tube. The separation membrane, the feed-side passage material, and the first permeation-side passage material are spirally wound around the second permeation-side passage material. The feed-side passage material and the first permeation-side passage material are disposed respectively on the feed side and permeation side of the separation membrane. The effective perforated-part area as calculated by multiplying the total area of the perforations in the perforated cored tube by the percentage of openings in one layer of the second permeation-side passage material is at least 1.0 time the inner cross-sectional area of the core tube. *See page 4 second paragraph.*

According to the present invention, the effective perforated-part area is at least 1.0 time the cross-sectional area of the core tube, the pressure loss around the perforated parts is close to its lower limit even when the number of laps of the permeation-side passage material is 2 or larger. The pressure loss around core tube perforated parts which is problematic especially in low pressure operations can be diminished. *See* page 4, third paragraph.

**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

The issue on appeal is whether the Examiner improperly finally rejected claims 1-5 under 35 U.S.C. § 103(a) as allegedly being unpatentable over WO 02/051528 to De La Cruz (“Cruz ‘528”) in view of Schmidt (US 6,352,641; “Schmidt”).



## **VII. ARGUMENT**

Claims 1-5 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over WO 02/051528 to De La Cruz ("Cruz '528") in view of Schmidt (US 6,352,641; "Schmidt").

For the reasons below, it is respectfully submitted that the combination of Cruz '528 in view of Schmidt does not render obvious the subject matter of claims 1-5.

Claim 1 recites a spiral separation membrane element comprising a perforated cored tube formed with a plurality of perforations; a separation membrane; a feed-side passage material; a first permeation-side passage material; and a second permeation-side passage material being spirally wound around the perforated cored tube, wherein the separation membrane, the feed-side passage material, and the first permeation-side passage material are spirally wound around the second permeation-side passage material; the feed-side passage material and the first permeation-side passage material are disposed respectively on the feed side and permeation side of the separation membrane; and the effective perforated-part area as calculated by multiplying the total area of the perforations in the perforated cored tube by the percentage of openings in one layer of the second permeation-side passage material is at least 1.0 time the inner cross-sectional area of the core tube.

None of the cited reference discloses or suggests the recitation of the effective perforated-part area as calculated by multiplying the total area of the perforations in the perforated cored tube by the percentage of openings in one layer of the second permeation-side passage material is at least 1.0 time the inner cross-sectional area of the core tube, as recited in claim 1.

Cruz '528 discloses low pressure drop spiral wound modules for applications such as reverse osmosis or ultrafiltration as claimed in the instant application. The Examiner takes the position that the first permeate side passage material in Cruz '528 is integral with the separation membrane (membrane is coated on it). The second permeate side passage material, which is wrapped around the core tube, is separate from the permeate side passage material.

Schmidt is relied upon as teaching a spiral wound element. The Examiner takes the position that Figure 2 of Schmidt shows multiple wraps of the permeate spacer material around the core.

The Examiner acknowledges that Cruz '528 and Schmidt do not disclose or teach the recitation that the effective perforated-part area as calculated by multiplying the total area of the perforations in the perforated cored tube by the percentage of openings in one layer of the second permeation-side passage material is at least 1.0 time the inner cross-sectional area of the core tube.

However, the Examiner takes the position that this limitation is a result effective variable, which can be optimized. To support his position, the Examiner cites Haq (US 6,702,941), at Col. 26, lines 34-55. The Examiner asserts that Haq discloses that the perforated area should be at least equal to the cross-sectional area of the inlet tube to avoid perforations restricting the flow. See Final Office Action dated January 29, 2008, page 4, last paragraph.

Appellants respectfully disagree.

There is no reasonable basis for the conclusion that Haq is evidence that the effective perforated-part area is a result effective variable.

Specifically, the Examiner cited passage of Haq discloses that in order to prevent the perforations from acting as a flow restriction during dead end filtration, the total area of the perforations 71 is preferably at least as large as the cross-sectional area of the portions of the upper end face of the filter pack 20. Col. 26, lines 47-51. This is not a disclosure of the effective perforated-part area as calculated by multiplying the total area of the perforations in the perforated cored tube by the percentage of openings in one layer of the second permeation-side passage material is at least 1.0 time the inner cross-sectional area of the core tube, as recited in present claim 1. Also, the Examiner cited passage of Haq is not a disclosure that the effective perforated-part area is a result effective variable.

Appellants respectfully submit that Haq does not calculate the effective perforated-part area by multiplying the total area of the perforations in the perforated cored tube by the percentage of openings in one layer of the second permeation-side passage material.

In addition, there is no disclosure in the cited reference itself, Cruz '528 or Schmidt, that teaches or suggests the effective perforated-part area is a result effective variable. The examiner has failed to establish a prima facie case of obviousness. Specifically, in order for it to possibly have been obvious to optimize an alleged result-effective variable, the variable must be identified as a result-effective variable in the art. *See, In re Antonie*, 195 USPQ 6, 8-9 (CCPA 1977). It is irrelevant as to what the Examiner asserts that Cruz '528 and Schmidt "should" recite, but the actual disclosure of Cruz '528 and Schmidt is what should be considered.

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For at least the foregoing reason, the combination of Cruz '528 in view of Schmidt does not render obvious the subject matter of claim 1. Accordingly, Appellants respectfully request that the §103 rejection be withdrawn and that the application be passed to issue.

In view of the above, Appellants submit that the Examiner's rejection is improper and should be reversed.

Please charge said fee required under 37 C.F.R. § 41.37(a) and 1.17(c) to Deposit Account No. 19-4880. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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Date: August 18, 2008

## **CLAIMS APPENDIX**

### **CLAIMS 1-5 ON APPEAL:**

1. A spiral separation membrane element comprising:
  - a perforated cored tube formed with a plurality of perforations;
  - a separation membrane;
  - a feed-side passage material;
  - a first permeation-side passage material; and
  - a second permeation-side passage material being spirally wound around the perforated cored tube, wherein
    - the separation membrane, the feed-side passage material, and the first permeation-side passage material are spirally wound around the second permeation-side passage material;
    - the feed-side passage material and the first permeation-side passage material are disposed respectively on the feed side and permeation side of the separation membrane; and
    - the effective perforated-part area as calculated by multiplying the total area of the perforations in the perforated cored tube by the percentage of openings in one layer of the second permeation-side passage material is at least 1.0 time the inner cross-sectional area of the core tube.
2. The spiral separation membrane element as claimed in claim 1, wherein the second permeation-side passage material is wound around the perforated cored tube so as to make substantially 2-15 laps.

3. The spiral separation membrane element as claimed in claim 1 or 2, wherein the separation membrane includes at least one of a ultralow-pressure reverse osmosis membrane, ultrafiltration membrane, or microfiltration membrane.

4. The spiral separation membrane element as claimed in claim 1, wherein the first permeation-side passage material is monolithic with the second permeation-side passage material.

5. The spiral separation membrane element as claimed in claim 1, wherein the first permeation-side passage material is separated from the second permeation-side passage material.

**EVIDENCE APPENDIX:**

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

None.

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**RELATED PROCEEDINGS APPENDIX**

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).

None.